Tables for the Identification of Mineral Unknowns

Geology 1

Pasadena City College

Geology 1 Mineral Identification Tables

The table that follows is intended to help you identify the mineral unknowns that you will be studying during Geology 1.

All of the minerals you will study are contained in this table, along with some other minerals that we will be discussing in class or that you may have heard of. Some of the minerals in this table are ones that you will not see in this class (Diamond), but should be aware of.

Bring this mineral table with you to all of your class sessions (print it out and keep it in a binder with your notes).

This table is arranged in two parts:

Part 1: Minerals with Non-Metallic Luster

Part 2: Minerals with Metallic Luster

Each part is further arranged according to hardness.

Mineral Identification Table Part 1: Non-Metallic Luster

Hardness	Luster	Color	Streak	Specimen Structure	Cleavage & Fracture	Heft	Misc. Properties	Name/Chem. Formula
1-2	Waxy, silky, pearly	White; gray; greenish	White	Foliated or massive	One perfect cleavage	M	Slippery feeling	TALC
1-2.5	Earthy	White; slightly colored by impurities	White	Massive		L	Slippery feeling; clay odor when breathed upon	KAOLINITE
1-2	Earthy	White; slightly colored by impurities	White	Massive or laminated		VL	Miscroscopic organisms (diatoms)	OPAL Var. diatomite
1-2	Earthy	White	White	Massive or oolitic		L		CALCITE Var. chalk
1-3	Earthy	White, cream, red-brown	Same as mass	Pisolitic (pisolites are pea-like structures)		L	Colors due to traces of hematite and limonite	BAUXITE
1-4	Earthy	Rusty-red	Same as mass	Massive or oolitic		M-H		HEMATITE Var. ochre, oolitic, etc.
1-4	Earthy	Yellow; yellow-brown	Same as mass	Massive or nodular		M	Also oolitic when replacing glauconite	LIMONITE Var. yellow, ochre, bog ore, etc
1.5-2.5	Resinous	Pale yellow	Pale yellow	Massive, granular or single crystals	Uneven or conchoidal fracture	VL	Smells like matches	NATIVE SULFUR
2	Pearly; vitreous; dull = massive; silky = fibrous	White, colorless, colored by impurities	white	Massive or granular or fibrous; cleavage fragment; twinned or complicated crystals	One good cleavage & 2 poor, the latter oblique to each other	L		GYPSUM Var. selenite (transparent); Alabaster (massive or granular); satin spar (fibrous)
2	Vitreous or pearly	Gray-white or green	Light gray	Foliated	One good cleavage	M	Flexible but not elastic; may resemble mica	CHLORITE Complex hydrous silicate
2-2.5	Pearly	Black or	Light	Cleavage fragment;	One perfect	M	Elastic; thin	BIOTITE

		dark brown	gray or brown	pseudohexagonal tabular “books”	cleavage		cleavage fragments show streak color	Fe mica
2-2.5	pearly	Silver-white or pale green	white	Same as biotite	One perfect cleavage	M	Transparent; elastic	MUSCOVITE K mica
2.5	Silky, greasy	Dark green or yellow green	Greenish-gray or black	Fibrous		M		SERPENTINE Var. asbestos
2.5	Vitreous	White; colorless; colored by impurities	White	Massive or granular or cleavage fragment or cubic crystals	3 cleavages at 90º (cubic)	L	Salty taste; transparent	HALITE Var. rock salt
2.5-3	Vitreous	White; colorless; colored by impurities	White	Granular; cleavage fragments; tabular crystals	3 cleavages; unequally good, one angle oblique	H	Heavy for a white mineral	BARITE
3	vitreous	White; colorless; colored by impurities	white	Massive or granular or cleavage fragment or “dog-tooth” crystals	3 cleavages at oblique angles (rhombohedral)	M	Effervesces in dilute HCl	CALCITE Var. Iceland spar (transparent); travertine (banded)
3.5	Vitreous	White; colorless; colored by impurities	White	Massive; granular; rhombohedrons (curved)	3 cleavages at oblique angles (rhombohedral)	M	Slightly harder than calcite; effervesces in dilute HCl only if powdered	DOLOMITE
3.5-4	Resinous to vitreous	Yellow to dark brown	Pale yellow	Massive or granular or cleavage fragment	6 cleavages at oblique angles (dodecahedral)	M+	Smells like sulphur	SPHALERITE
3.5-4	Vitreous or earthy	Bright green	Green	Massive or granular or mammilary or nodular or fibrous		M+	Often with azurite	MALACHITE
3.5-4	Vitreous or earthy	Light to dark blue	Blue	Massive or granular or mammilary or nodular or fibrous		M	Often with malachite	AZURITE
4	Vitreous	Colorless, green, purple, etc	White	Cleavage fragment or cubes or octahedrons	4 cleavages at oblique angles (octahedral)	M		FLUORITE

4	greasy	Dark green or yellow green	Green-gray or white	Massive		M-	Slippery feeling	SERPENTINE
4-4.5	Vitreous or silky	Green	Green-gray to white	Fibrous or bladed crystals	2 cleavages at oblique angles (56º-124º)	M	Amphibole family	ACTINOLITE Complex Ca Mg Fe silicate
4.5-5.5	Earthy or submetallic	Brown or black	Brown or black	Massive or nodular		M+		LIMONITE
4.5-6.5	Dull or metallic *(see part 2 of Mineral ID Table)*	Dark red or shiny black	Red or brown-red	Massive or sparkling black scales	parting	H	Streak is most diagnostic property	HEMATITE Var. pencil or kidney ore (both are mammilary); specularite (silvery black); micaceous specularite (black scales)
5	Vitreous	Yellow, green, brown, etc	White	Massive or hexagonal prisms	One poor cleavage	M		APATITE
5-6	Earthy or submetallic *(see part 2 of Mineral ID Table)*	Dark gray or black	Brown-black	Massive or nodular		H	Often with pyrolusite	PSILOMELANE
5.5	Vitreous or dull	Black or dark green	Black or dark green	Cleavage fragment or stubby prismatic crystals	2 cleavages at nearly 90º	M	Pyroxene family	AUGITE
5.5	Vitreous	Black or dark green	Gray-green to white	Cleavage fragment or elongated crystals with diamond-shaped cross section	2 cleavages at oblique angles (56º-124º)	M	Amphibole family	HORNBLENDE Complex CaMgFeAl silicate
5.5	Vitreous or pearly	White	White	Fibrous or bladed crystals	2 cleavages at oblique angles (56º-124º)	M	Amphibole family	TREMOLITE Complex CaMg silicate

5.5-6	Vitreous to pearly	Blue, lavender-blue gray	Gray-blue	Massive, or granular or fibrous	2 cleavages at oblique angles (56º-124º)	M	Amphibole family	GLAUCOPHANE
5 & 7	Vitreous	Gray-blue, green-blue	White	Bladed crystals	One good cleavage on side of blade	M	H=5 parallel to blade; H=7 across blade	KYANITE
5.5-6.5	Vitreous	White, gray, multi-colors	White	Massive	Conchoidal fracture	L	Softer than chalcedony; may be banded	OPAL
6	Waxy	Colorless, white, pink, gray, etc	White	Cleavage fragment or square prisms	2 cleavages at 90º	M	May contain perthite	ORTHOCLASE
6	pearly	Colorless, white, gray, etc	white	Cleavage fragment or square prisms	2 cleavages at 90º	M	Twinning striations on one cleavage parallel to the second cleavage	PLAGIOCLASE
6-7	Vitreous to dull	Yellow-green or dark green	Gray	Massive or granular or long light or dark crystals	One cleavage	M	Often in thin veins	EPIDOTE
6-7	Vitreous to silky	Gray, brown, yellow, greenish	White	Radiating fibrous masses	One cleavage	M		SILLIMANITE
6-7	Vitreous	Grass-green	White	Granular	Conchoidal fracture	M		OLIVINE

7	Vitreous	Colorless, white, gray, etc	White	Massive or granular or hexagonal prisms and pyramids	No cleavage; conchoidal fracture	M		QUARTZ Var. rock crystal (clear); smoky; rose; milky; amethyst (purple); etc
7	Waxy	White, gray, red, yellow, etc	White or light-colored	Massive or odular or mammilary	No cleavage; conchoidal fracture	M		CHALCEDONY Var. typical (colorless); jasper (red, yellow, brown); flint (dark gray, black); chert (light); agate (mottled or banded)
7-7.5	vitreous	Reddish-brown	Light tan or white	Prismatic crystals	Poor cleavage	M+	Often twinned	STAUROLITE
7.5	Vitreous	Wine-red, brown, green, etc	White	Massive or crystal fragments or dodecahedrons and other forms with many faces	Subconchoidal fracture	M		GARNET Many varieties with general formula: e.g. almandite
7.5	Vitreous	Black, pink,green, etc	White or light gray	Trigonal prisms, many faces, or striated	Subconchoidal fracture	M		TOURMALINE Var. schorl (black); rubellite (pink); elbaite (green); complex boro-silicate
8	Vitreous	Pale green, white	White	Massive or crystal fragment or hexagonal prisms	Conchoidal fracture	M		BERYL Var. emerald (green); aquamarine (blue); common
8	vitreous	Pale yellow, white, etc	white	Complex prisms with steep ends; or cleavage fragment	One perfect cleavage	M+		TOPAZ

9	Vitreous to waxy	Gray, brown, etc	White	Crystal fragment or hexagonal prisms	Basal parting	M		CORUNDUM Var. ruby (red); sapphire (blue); common
10	adamantine	Colorless or colored by impurites	white	octahedrons	Octahedral cleavage	M		DIAMOND

Mineral Identification Table Part 2: Metallic Luster

Hardness	Luster	Color	Streak	Specimen Structure	Cleavage & Fracture	Heft	Misc. Properties	Name/Chem. Formula
1-1.5	metallic	Silver-gray	Dark gray	Foliated	One perfect cleavage	H	Slippery; gives off blue light between flakes	MOLYBDENITE
1-2	Metallic	Dark gray or black	Dark gray or black	Foliated	One perfect cleavage	L	Slippery feeling; writes on paper	GRAPHITE
2-2.5	Metallic	Silver-gray	Dark gray or black	Bladed	One good cleavage on one side of blade	H	May tarnish black or gun-metal blue	STIBNITE
2.4-3	Metallic	Copper-red	Copper-red	Wires, etc		VH	Tarnishes black or green; malleable	NATIVE COPPER
2.5-3	Metallic	Golden yellow	Golden yellow	Tiny grains, etc		VH	Malleable	NATIVE GOLD
2.5-3	Metallic	Silver-gray or dark gray	Dark gray or black	Cleavage fragments or cubes or octahedrons with dull faces	Perfect cubic cleavage	VH	Looks like lead	GALENA
3.5-4	Metallic	Rich brass	Green-black	Massive or granular	Conchoidal fracture	H	Slight tarnish; softer than pyrite	CHALCOPYRITE
5-6	Metallic *(see part 1 of Mineral ID Table)*	Dark gray or black	Brown-black	Massive or nodular		H	Often with pyrolusite	PSILOMELANE
5.5-6.5	Metallic *(see part 1 of Mineral ID Table)*	Black	Brown-red	Massive or sparkling black scales	Parting	H		HEMATITE Var. specularite (black massive); micaceous specularite (foliated)

5.5-6.5	Metallic	Gray-black	Gray-black or brown-black	Massive or granular	Poorl cleavage; subconchoidal fracture	H	Magnetic	MAGNETITE
6-6.5	metallic	Pale brass	Green-black	Massive or granular, cubes, pyritohedrons	Conchoidal fracture	H	Cubes may be striated; harder than chalcopyrite	PYRITE